

1993

Impacts of Decreased Military Spending in Western Massachusetts Communities: Some Preliminary Considerations

Center for Economic Development

Follow this and additional works at: https://scholarworks.umass.edu/ced_techrpts

 Part of the [Defense and Security Studies Commons](#), [Economic History Commons](#), [Economic Policy Commons](#), [Growth and Development Commons](#), [Industrial Organization Commons](#), [Military and Veterans Studies Commons](#), [Policy Design, Analysis, and Evaluation Commons](#), [Regional Economics Commons](#), [Urban, Community and Regional Planning Commons](#), and the [Urban Studies and Planning Commons](#)

Center for Economic Development, "Impacts of Decreased Military Spending in Western Massachusetts Communities: Some Preliminary Considerations" (1993). *Center for Economic Development Technical Reports*. 157.

Retrieved from https://scholarworks.umass.edu/ced_techrpts/157

This Article is brought to you for free and open access by the Center for Economic Development at ScholarWorks@UMass Amherst. It has been accepted for inclusion in Center for Economic Development Technical Reports by an authorized administrator of ScholarWorks@UMass Amherst. For more information, please contact scholarworks@library.umass.edu.

**Impacts of Decreased Military Spending
in Western Massachusetts Communities:
Some Preliminary Considerations**

Fall 1993

Principal Investigators:

Meir Gross, Ph.D.

John Mullin, Ph.D., A.I.C.P.

The Center For Economic Development wishes to thank the
research team:

Janet Kreda

James Russ

The Center for Economic Development at the University of Massachusetts, in Amherst, is part of the Landscape Architecture and Regional Planning Department and is funded by the Economic Development Administration of the US. Department of Commerce, and the University of Massachusetts.

Table of Contents

List of Figures

Executive Summary

I. General Discussion	1
Difference Between Federal Dollars and Private Sector Dollar	1
Federal Defense Spending and its Effect on Regions	1
Federal Defense Spending and its Effect on the New England Region	2
Federal Defense Spending and Inflation	3
Federal Defense Spending and Employment	4
II. Potential Local Impacts	4
Background	4
Summary of Prime Contract Awards	6
Industrial Mix	10
III. Looking at the Community Level: Where To Go From Here	12
Community Impacts	13
Economic Impacts	13
Labor Impacts	15
Social Impacts	15
Fiscal impacts	16
IV. Conclusions	17
Bibliography	19
Additional Resources	20
Appendix A	
Appendix B	

List of Figures

Figure 1: Prime Contract Awards (\$25,000 and over) 1987-1991 in Millions of Dollars	7
Figure 2: Prime Contract Awards by County, 1987-1991 in Millions of Dollars	7
Figure 3: Top Twenty Companies Receiving Prime Contract Awards, 1991	8
Figure 4: Duration of Contracts and Percent Total Dollars	9
Figure 5: Manufacturing Industries by Standard Industrial Code and Total Prime Contract Dollar Awards: 1987-1991	11

Executive Summary

The following report addresses how the current changes in defense spending will impact communities in Western Massachusetts. It is evident that military spending will continue to decrease. This decrease, combined with the overall decrease in manufacturing industries is having an adverse impact on many communities. The degree of impact and how to offset, or respond to these changes is a concern of many community planners, and is the subject of this report. The information contained in this report is useful for local planners and citizens who may not necessarily have a background in regional economics or industrial development or military spending. The methods used provide a basic framework for determining first what industries in your community rely on defense dollars and second, how significant that reliance is to your local economy.

This report contains a listing of companies within the four Western Massachusetts counties: Berkshire, Franklin, Hamden and Hampshire Counties, which have received prime contract awards from the Department of Defense between FY 1987- FY 1991. Out of the total \$378 million awarded to Western Massachusetts companies in 1991, 84% or \$381 million went to General Electric of Pittsfield. Of the total prime contract dollars received, 98% went to only 15 companies. The remaining 2% was distributed to 65 other companies. A similar pattern is seen in the previous years. The report identifies the Standard Industrial Code (SIC) of these companies, where possible, and illustrates the diverse mix of industries and service companies which contract with the Defense Department. This information is not complete because many of the companies are small, privately held firms, and information about them is not easily accessible.

The report is divided into four sections. It will first examine the results of a decade of increased military spending in the 1980's. Such spending has created a dependency cycle in industry, rather than let market forces run their course. As a result, defense dependent regions are vulnerable since they are so intimately tied to fluctuating foreign policy conditions. Second, the potential local impacts of cutbacks will be discussed. The third part of the report helps in determining what industries are related to the defense industry, and the impacts of those industries on the local economy. The last part of the report will briefly discuss redevelopment potential and the new programs supported by the Clinton Administration to assist communities affected by changes in military spending.

Several problems associated with conducting this research will be discussed. An accurate and meaningful assessment of the local impacts of defense cutbacks would require substantial time and funding as well as significant economic expertise. The pathways for military dollars form a virtual labyrinth. Tracing Department of Defense (DOD) Dollars in the Western Massachusetts regional economy is complex and difficult and probably cannot be done with a high degree of accuracy. While it is easy to obtain listings of prime contractors, (that is companies that are awarded contracts of over \$25,000 with DOD), it is exceedingly difficult to obtain detailed information about subcontractors. This is critical because, the major contractors farm out 40-60% of their work to subcontractors.

There are many articles and studies which look at the Massachusetts economy as a whole, but they do not reflect the conditions in Western Massachusetts. There are volumes of information on the national, regional and state level regarding military spending. Thus, difficulties arise in trying to hone that information down to the local level. While Massachusetts companies received over \$6.9 billion in prime DOD contracts in 1991, only \$378 million went to companies in Western Massachusetts, with an additional \$16.7 million associated directly with the operations at Westover Air Force Base. Additionally, the Western Massachusetts defense related economy is more closely linked to the Western Connecticut economy than to that of Eastern Massachusetts therefore making it more difficult to isolate the economic implications on Western Massachusetts.

A large portion of DOD dollars which go to Eastern Mass prime contractors are earmarked for the high tech, research and development oriented side of the defense industry. In Western Mass, many of the DOD dollars are spent on the small manufacturing firms as well a significant number of service industries, construction companies, and a variety of other industries. This is an important difference to recognize. Any generalization about military spending in the Commonwealth will be flawed at the expense of Western Massachusetts because that portion of the state does not have the same degree of high technology military related industries.

Another problem is that the terminology used by the Department of Defense and other sources is ambiguous. Most importantly, the term "defense industry" itself is a misnomer, because in fact there is no single industry or group of industries that can be identified as "defense industries." Also there are varied interpretations of what constitutes a "prime contract." The term used by the Department of Defense, means a company awarded a contract directly from DOD of \$25,000 or more. The Directorate for Information Operations and Reports (DIOR), which is the primary source for data, defines a prime contract as any contract of over \$25,000 regardless of its origin.

This means that a company receiving orders totaling \$25,000 or more, whether they be subcontracts or direct contracts, are labeled prime contractors.

This report is designed to provide a starting point for communities wanting to find out about the impacts of changes in defense spending. It provides some basic information and tools for assessing defense dependency in Western Massachusetts, and also identifies the significant pitfalls in undertaking such an assessment at the community level.

I. General Discussion

The Difference Between Federal Dollars and Private Sector Dollar

A long-standing debate in American economic theory has been the impact of defense spending on our overall economy. In light of the recent decline in defense spending, due to the emergence of a "peace dividend," it is again a relevant question to explore. Does military spending rather than spending on social programs, or job creation hurt the economy of the United States? Do the economic impacts of defense spending differ from other forms of government spending? With Massachusetts being the third largest beneficiary of prime military contracts over \$25,000 in 1990(DIOR, 1990) clearly the "peace dividend" has affected the economy of the Commonwealth. If it can be argued that defense spending is ultimately counterproductive then there is no time like the present for industry to target the private sector for future markets.

Federal Defense Spending and its Effect on Regions

A high concentration of military spending in a few regions of the United States, at the expense of the rest of the country is a major criticism. In theory all states should benefit equally from the influx of money and jobs from the Department of Defense Revenue to support the DoD, like other federal agencies, comes proportionally from all states while defense supported industries are concentrated in but a small number. Michael Dee Ogden, in "A Military Dollar Really is Different," suggests that military spending creates a fiscal imbalance because revenue and economic activity are redistributed from all states to relatively few states. Therefore many states actually experience a "tax drain" as tax revenues leaves the state and do not return as federal purchases or wage payments (Ogden, 1986).

A problem associated with this uneven distribution of defense money is the disruption of market economies in various regions of the country. Initially most regions of the United States were involved in some form of military hardware procurement. In fact government defense policy during World War II dictated that many regions of the country be involved in the armamentation of our nation. In essence military manufacturing was closely attached to civilian durable goods manufacturing, i.e.; New York through the Great Lake states (Markusen and Yudken, 1992). As the concentration of defense industries developed in the "defense parameter" of the northeast, west and northwest, new infrastructure was developed at exorbitant cost while former defense

manufacturing locations in the Midwest were abandoned. This process left many cities in the industrial heartland with fewer jobs and an eroding tax base and the newly emerging regions making long-term investments in infrastructure improvements to accommodate new growth, making themselves vulnerable to potential future military spending cutbacks (Markusen and Yudken, 1992).

Federal Defense Spending and its Effect on the New England Region

The recent economic downturn in the Commonwealth of Massachusetts and in neighboring states like Connecticut serve as a forceful reminder that industries in the Northeast are caught in a dependency cycle with regard to military contracts.

In the latter half of the 1980's research conducted by Barry Bluestone and John Havens of Boston College called attention to this dependency as it related to industry in the Northeast seaboard region (Bluestone and Havens, 1986). The researchers note that one of the most dramatic symptom of this dependency is the "...almost inevitable boom-bust pattern of employment associated with the cycles of new weapons procurement". As examples they point to heavily dependent regions of the country like Seattle, Washington, Long Beach California, East Hartford Connecticut, and Lynn Massachusetts. Each of these regions have benefited from sharp increases in defense related work, only to be followed by massive layoffs months or years later. The researchers point being that extreme fluctuations in labor demand stress local services, create labor surpluses and shortages and often upset local property values. These surpluses and shortages lead to inefficiency in the marketplace because skilled employees are periodically left without jobs and are forced to either rely on social services or move to other regions of the country in pursuit of new employment.

High technology industry is one industry that has a strong dependence on Department of Defense expenditures. This phenomenon is especially important in Massachusetts where high technology industries are prevalent. Markusen and Yudken, in their work; Dismantling the Cold War, define high tech industries as those with higher than average shares of scientists, engineers, computer scientists, life scientists and mathematicians. They found that 36 percent of all high-tech manufacturing industries are dependent *mainly* on the Pentagon, and these industries employ 47 percent of the high-technology work force in the United States. Also, sixty two percent of the highest Pentagon dependent industries are considered high technology (Markusen and Yudken, 1992).

It is important to note that there are many other industries that survive primarily because of government contracts in one form or another. A prime example of this might be a large construction company that specializes in bridge and road construction. Nonetheless defense related industries are far and away the most dependent on the federal government. In 1992 over seventy percent of all government purchases were defense related as was over seventy percent of all federally sponsored research and development (Markusen and Yudken, 1992).

Federal Defense Spending and Inflation

It is widely accepted that military spending alone is not to blame for inflation in the US. economy, however most economists agree that the impact of increased military spending on the inflation rate fluctuates with the strength of the whole economy.

It can be argued that military spending has forced prices up. A main reason for this is the sheer magnitude of military related spending in the US. economy. Military-related spending historically represents around 70 percent of all federal purchases of goods and services from the private sector. Prices go up because military spending causes increased demand. Increased military spending adds to demand but adds nothing to the available supply of goods and services. Michael Dee Ogden in "A Military Dollar Really is Different" notes that: "The military hires workers and increases income directly, and its increased demand for military goods stimulates employment and income in the private sector, but nothing is produced which satisfies the additional demand for consumer or capital goods. Demand is created without any corresponding supply..." (Ogden, 1986).

Ogden goes further with the notion that, "...other federal programs tend to create goods or services which form a part of social consumption or serve as inputs for production or distribution process. When federal funds go to highway construction or mass-transit, goods are created which, when used by private firms or individuals, lower costs or satisfy demand. The same is not true of defense "goods" which will, hopefully never be used.

Defense spending can also be deemed inflationary because of program inefficiencies as well as the sheer cost of the high-tech equipment being produced. Cost overruns and production delays are well documented and commonplace with regard to military contracts creating inefficiency. Exorbitant costs for military hardware can be attributed to the obsession in our society to increase

the performance of weapons at all cost. This in the past can be attributed to the cold war, but it is also a grounded in the desire of our nation to be at the forefront of weapons technology.

To maintain this military advantage, virtually every new weapons system experiences an increased production cost. The need to stay in ahead of potential adversaries in size, age and capability has led to increased performances of weapons, but also increased per unit costs. The XM-1 tank in the early 1980's is an example of this phenomenon. The XM-1 is far superior to the M60 tank it was slated to replace in the early 1980's, but it cost three times as much to manufacture. It might even be argued that it was three times as effective, but if the United States wanted to retain the same number of tanks in its arsenal it would have to spend three times as much (Gansler, 1980).

Federal Defense Spending and Employment

We have always heard the woes of communities or regions that have been hit by the closure of a military installation, or the manufacturing plant that lost a government contract. This news is always accompanied by the loss of jobs figures. In the United States defense spending is connoted with jobs. There are many who argue that defense spending, while creating jobs, does not create as many as would be created if the same money were spent in the private sector (Gansler, 1980). In fact if a policy of job creation includes increased defense spending, that policy is doomed to fail. This is the case because the defense sector does little to lessen the plight of the hard-core unemployed. Increasingly defense related employment relies on a highly skilled work force. Studies have shown that, per dollar, expenditures on military hardware generate half as many jobs as might be created in the civilian market, while military salaries are twenty percent higher (Ogden, 1986). The presupposition that military spending is going to create jobs and therefore wealth could be rooted in the experience of W.W.II when mobilization brought the economy out of the Great Depression.

II. Potential Local Impacts

Background

The potential impacts of defense cutbacks to the Massachusetts economy is a pressing question in the post cold war economy of today. Assessing the effects of current reductions in defense spending is a complex task. First, it is difficult to isolate the impacts of defense spending cutbacks

from the widespread impacts of a worldwide recession and from the regional decline in the manufacturing base. Secondly, tracking military spending involves unraveling a complicated network of federal defense contracts. Billions of dollars are contracted directly to companies doing work for the Department of Defense. However these prime contractors will typically farm out 40-60% of a weapon systems to its lower-tier suppliers (Gansler, 1989). While the prime contractors (\$25,000 and up) are visible and are well documented, the subcontractors and industries affected directly and indirectly by federal defense cutbacks are poorly documented in the public record, and are difficult to trace (Markusen, et al, 1991).

Military spending in Western Massachusetts is markedly different from the rest of the state. The region does not receive any significant portion of the high tech and Research and Development work typical of the Boston area contractors. Aerospace engine prime contractors like General Electric in Lynn, Massachusetts as well as out of state contractors like United Technology's Pratt and Whitney division in Hartford, Connecticut, have elaborate webs of specialty machine shops across Massachusetts supplying them with precision parts and pieces. While there are a couple of large contractors in the region, there are more typically a number of small shops throughout the Connecticut River Valley which do work that is subcontracted for the Department of Defense. Without extensive survey work, it is really impossible to say what the impact of the loss of defense work would be. Depending on the size of the shop and the percentage of defense related work done, the impacts of lost contracts will vary substantially. In addition, research has shown that in Western Massachusetts, there are much closer north-south economic links down-valley to Connecticut than east-west between the Connecticut River Valley and eastern Massachusetts.

The most detailed source of information about military spending is the Directorate for Information Operations and Reports (DIOR), which publishes detailed information about Defense Department contracts of over \$25,000, or Prime Contract awards. Unfortunately, this data reveals only limited information about what is actually going on at the local, or subcontract level. However, subcontracts make up a considerable portion of the true defense spending picture, and an inventory or overview of subcontractors has not been done since 1979 (Center for Economic Conversion, 1984). Thus data to conduct a complete analysis is scarce.

It is not plausible to generalize about the impacts of changes in defense spending in Western Massachusetts, because there are two significant anomalies in the region. The first is that General Electric (GE) in Pittsfield has consistently received more than 90% of the military prime contract dollars in Western Massachusetts over the 1987-91 period covered in this report. The operations at GE have now been closed, dealing a severe blow to the Pittsfield area and Berkshire region. This

closure is likely to have some long term ripple effects in Western Massachusetts. Since GE represented such an overwhelming majority of the Defense spending in the region, it severely skews the data. Furthermore, since GE is now closed it makes sense to keep the impact of GE separate from the analysis of Western Massachusetts.

Secondly, Westover Air Force Base (AFB), located in Chicopee, represents a significant portion of the Department of Defense contracting in Hampden County. It has been discussed in the previous section that military dollars are different from private sector dollars. In addition, even within the military, there are differences. For example, prime contracts related directly to the Air Force Base will differ dramatically from other prime contract expenditures with DOD. This is because the base requires things like building maintenance and personnel housing, as well as support services to base personnel which benefit diverse segments of the local economy. Therefore, cutbacks at military bases affect the local economy differently than other changes in defense spending.

In addition, the prime contractors listed for the Air Force Base are listed only by name, not by location. While some company names provide obvious clues to their location (i.e. Palmer Paving) most do not. Therefore, it is difficult to figure out which companies are actually located in Western Massachusetts, and which are outside the region and/or outside of the state. For these reasons, Westover Air Force Base is handled separately from the whole of Western Massachusetts.

The data for Western Massachusetts presented in this report are based on prime contract dollar awards to all communities within Franklin, Berkshire, Hampshire and Hampden counties. In the tables presented below, figures given for Western Massachusetts *do not include GE or Westover AFB*. The figures for GE and Westover AFB are listed separately to emphasize the context of these two entities in the Western Massachusetts economy. But as stated, they are *not* included in the discussion of Western Massachusetts as a whole. No in depth analysis about the impacts of changes in defense spending will be given for GE or Westover, as it is beyond the scope of this report.

Summary of Prime Contract Awards

In 1990, Massachusetts companies received \$8.17 billion in prime contracts from the Department of Defense, which makes the state second only to Virginia in per capita Defense spending. Massachusetts ranks third, behind California and Texas in total dollars awarded in prime contracts. (Kaznocha, 1991) (See Figure 1). The Massachusetts Department of Employment and Training

(DET) estimates that in 1990, approximately 81,000 employees throughout Massachusetts work in Defense related industries (Kaznocha, 1991). A report completed by the state of Massachusetts in 1992 nearly doubles this estimate to 156,000 employees. (Machine Action Trade Project, 1993) These numbers are daunting and are substantial cause for alarm. There is no question that the Massachusetts economy has a lot at stake if there are significant defense spending cutbacks.

Figure 1: Prime Contract Awards (\$25,000 and over) 1987-1991 in Millions of Dollars.

LOCATION	1987	1988	1989	1990	1991
Western Mass.	\$46	\$58	\$65	\$44	\$51
General Electric	545	407	511	438	318
Westover AFB	17	32	8	7	17
Massachusetts	8,685	7,212	8,757	8,165	6,933

Source: Directorate for Information Operations and Reports (DIOR), Washington DC., 1987-91.

While the alarm is sounding across the state, there is little information about how changes in defense spending will specifically affect Western Massachusetts. Of the \$6.9 billion spent in the state in 1991, Western Massachusetts companies received barely one percent, or \$51 million. In previous years this percentage dropped as low as one half percent of the state total. The contract distribution varies significantly by county. (See Figure 2)

Figure 2: Prime Contract Awards by County, 1987-1991 in Millions of Dollars.

County	1987	1988	1989	1990	1991
Berkshire	0.8	0.1	0.3	0.4	2.0
General Electric	545.3	407.1	511.2	438.4	318.2
Franklin	5.5	2.2	7.1	3.5	2.9
Hampden	11.0	12.6	23.9	7.8	7.9
Westover AFB	17.4	32.3	8.0	6.9	16.7
Hampshire	29.1	43.3	33.5	32.8	38.3

Source: DIOR, Washington, DC., 1987-91

The top 20 companies receiving contracts in 1991 garnered over 90% of the total dollars awarded. (See figure 3) One quarter of these same 20 companies maintained a consistent contracts of over

\$500,000 per year over the five year period from 1987-1991. The remaining contracts are spread out over 60-70 other companies throughout Berkshire, Franklin, Hampden, and Hampshire Counties.

Figure 3: Top Twenty Companies Receiving Prime Contract Awards, 1991.

LOCATION	COMPANY	1991
Northampton	Kollmorgen Corporation	\$26,990,000
Amherst	University of Massachusetts	\$4,384,000
Amherst	Amerinex Artificial Intelligence	\$4,198,000
South Deerfield	Hardigg Industries Inc.	\$2,341,000
Chicopee	Strong Bill Enterprises	\$1,987,000
Pittsfield	General Dynamics	\$1,623,000
Springfield	Titeflex Corporation	\$872,000
Northampton	Yankee Hill Machine Co. Inc.	\$712,000
West Springfield	American Cyanamid Co.	\$688,000
Agawam	Wentgate Dynaweld Inc.	\$621,000
Amherst	Chan Computer Corp.	\$435,000
Easthampton	Riverside Industries Inc.	\$375,000
Amherst	Quadra Engineering Inc.	\$319,000
Chicopee	Zero Corporation	\$303,000
Dalton	Transistor Specialties	\$288,000
Northampton	Temp Pro Incorporated	\$273,000
South Deerfield	Sun Microsystems Incorporated	\$224,000
Westfield	Westfield Gage Co. Inc.	\$195,000
Chicopee	TLT Construction Corporation	\$170,000
Westfield	Gale Associates Inc.	\$166,000
Total of Top 20		\$47,164,000
Percent of Western MA total		92%
Western Mass Total		\$51,103,000

Source: DIOR, Washington, DC., 1987-91

It is interesting to note that 64% of the DOD contracts awarded in terms of the number of contracts were one for year only, with no repeat contracts within the five year period. Conversely, only 6%

of the companies were awarded contracts consistently, every year, over the 1987-1991 period. Significantly, these select companies received, on average, 52% of the total DOD dollars. (See Figure 4) It is likely that companies which concentrate their business on defense related work are most vulnerable to cutbacks. On the other hand, companies which filled a single contract for the DOD probably will not see any significant impact from changes in military spending. This pattern reflects what has been presented in the previous section. Companies which contract with the DOD tend to become specialized and gear their operations toward defense contracts, this in turn can lead to defense dependency. These are the companies which will be most affected by changes in defense spending. The hundreds of other companies which have filled a defense contract at one time or another are not relying on defense money, and therefore are not going to be affected by cutbacks.

Figure 4: Duration of Contracts and Percent Total Dollars

Length of contract	% number of contracts	% of total dollars
1 year	65%	8%
2 years	16%	7%
3 years	7%	4%
4 years	6%	4%
5 years	6%	52%

Source: Based on DIOR data on prime contractors, 1987-1991.

One may look at the data presented in this report (which only addresses prime contractors) and be tempted to draw the conclusion that aside from the loss of GE, defense cutbacks are not going to have a significant impact in Western Massachusetts. However, without any information about the subcontractors, one cannot make definitive or accurate conclusions about the potential impacts of defense spending cutbacks. Gansler notes in his book, Affording Defense, "...the defense industry is basically a 'dual economy' with an upper level (the large defense contractors) and a lower level (the subcontractors and part suppliers). The differences between the two levels are not simply matters of degree; rather the two levels are almost totally different in many respects, such as the way business is done, the basic industrial structures, and the problems which are almost exactly opposite." He goes on to say that, "The prime contractors do not tend to show much concern about the viability of the lower tier suppliers and subcontractors, and the result is a clear

deterioration of that portion of the defense industry, both in terms of numbers and a growing dependence on foreign suppliers." (Gansler, 1989:257-58)

The amount and number of subcontractors is difficult if not impossible to track. Subcontracts received by Western Massachusetts Companies do not necessarily come from Massachusetts prime contractors. Research has shown that in Western Massachusetts, there are much closer north-south economic links down-valley to Connecticut than east-west between the valley and Eastern Massachusetts. It was impractical, given the scope of this project to attempt to address the issue of subcontractors. This would require surveys and/or interviews of the prime contractors, not only in Massachusetts, but in Connecticut as well.

Industrial Mix

As mentioned before, for the past several years, General Electric in Pittsfield represented 90% of the prime contract dollars entering Western Massachusetts. The impact of this one company shutting down its operations in Pittsfield will be devastating. However, the increased defense spending of the 1980's also benefited hundreds of small metalworking, electronics and plastics firms across the state (MATP, 1993). Our findings indicate that federal military dollars entering the region are spread out over a wide variety of manufacturing and service industries.

The Machine Action Trade Project (MATP) surveyed 100 firms selected from a list of 1,095 small to medium sized firms that were dependent in some way upon defense dollars. These are firms which employ less than 100 people; typically they employ 50 people or less, and many have under 20 employees. This study, which focused on the metalworking, electronics, and the plastics industries, found that a substantial portion of the sales of these firms was to the DOD as well as to prime defense contractors. The increased defense spending in Massachusetts has benefited hundreds of small metalworking, electronics and plastics firms (MATP, 1993). The MATP study does not distinguish between subcontractors and prime contractors. The study found that of the 50 metalworking firms surveyed, 44% of total sales were Defense related, of the 40 electronics industry firms, 39% of total sales were defense related, and of 10 plastics firms, 27% of sales. While these three industries are significantly dependent upon defense dollars, defense spending in the region as a whole was not limited to these industries.

Over 300 companies, both manufacturing and non-manufacturing, have had prime contracts with the DOD in Western Massachusetts over the five year period 1987-1991. To get a feel for the range

of industries touched by defense spending, we use the Standard Industrial Code (SIC) to investigate the manufacturing companies. Although we could find information on only 51 manufacturers with prime contracts, these companies ranged over the gamut of industry types, from textiles and lumber to fabricated metal products, electronic equipment and aircraft engine parts. Figure 5 illustrates by SIC where the majority of the DOD dollars in Western Massachusetts (not including GE) went over the five year period from 1987-91.

Figure 5: Manufacturing Industries by Standard Industrial Code, and Total Prime Contract Dollar Awards: 1987-1991.

SIC CODE**	LOCATION	COMPANY	1987-91
26,30	South Deerfield	Hardigg Industries Inc.	\$13,283,000
30,33,34,35,37	Springfield	Titeflex Corporation	\$5,189,000
32,36	Westfield	Digital Equipment Corp.	\$2,529,000
34	Northampton	Yankee Hill Machine Co.	\$5,372,000
34,35,37	Southwick	B & E Tool Co. Inc.	\$1,249,000
34,35,37	Westfield	Berkshire Industries Inc.	\$5,628,000
34,35,37	Agawam	Jet Industries Inc.	\$1,263,000
35	Westfield	Westfield Gage Co. Inc.	\$2,600,000
36,38	Northampton	Kollmorgen Corporation	\$122,496,000
38	Westfield	Instrument Technology Inc.	\$1,348,000
		TOTAL	\$160,957,000
		Percent of Western Mass. Total 1987-1991	95%

Source: MacRae's State Industrial Directory: Massachusetts and RI, and George D. Hall's Directory of Massachusetts Manufacturers 1991, 1988.

**SIC CODE and Industry Type

26 -Paper and Allied Products, 30 -Rubber and Misc. Plastics, 32 -Stone, Clay and Glass Products 33 -Primary Metal Industries, 34 -Fabricated Metal Products, 35 -Industrial Machinery and Equip., 36 -Electronic and Other Equipment, 37 -Transportation Equipment 38 -Instruments and Related Products.

This list might be slightly misleading because many companies are listed as having more than one SIC code, for example, the Titeflex corporation in Springfield is listed as having five different codes. From the data available we don't know what specifically the company manufactured for the DOD. However, despite this limitation, this information does imply that there is not a narrow range of "defense related" industries, but rather, a diverse mix of industries which contract with the DOD.

The nature of defense spending in Western Massachusetts also differs from the state as a whole, in terms of its diversity. The following industries accounted for 88% of the prime military procurement contracts in Massachusetts: 3663- Radio and TV, 3671-Electronic Tubes, 372- Aircraft Parts, 376- Guided Missiles and Space Vehicles, 3811- Engineering and Scientific Instruments, 3825- Measuring and Testing Equipment, and 3832- Optical Instruments and Lenses. (DET, 1989) These categories are predominantly highly specialized, research and development oriented industries, whereas defense spending in Western Massachusetts not only cross-sections a broader range of industries and services, but is focused more on manufacturing and the machine trades, as opposed to high technology research and development.

III. At the Community Level: Where To Go From Here

The four counties of Western Massachusetts present four very different scenarios with regard to defense spending. For example, Hampshire county garnered over \$38 million in prime contracts, whereas Franklin County received only about \$3 million. As has been mentioned, General Electric in Pittsfield and Westover AFB create two unique situations in Berkshire and Hampden Counties respectively. Similarly, communities vary even more when it comes to military contracts. The first step for the local planner in order to determine the role of defense spending on the community economy is to find what companies in the community have prime contracts with the DOD. Appendix A presents a listing by county of Western Massachusetts companies who have contracted with the DOD from 1987-1991.

This information is available from the Directorate of Operations, Information and Reports (DIOR) in Washington, DC. The Directorate also has available for purchase more detailed information about what companies work on various weapon systems, etc., so that it is possible to determine what military program individual companies are working for. The Massachusetts Department of Employment and Training(DET), which has offices in the major metropolitan areas throughout the

state, also has some useful information and statistics, however the most detailed information is only available at the Boston office.

A second step that a local planner should take in order to determine the affects of military spending on the local economy is to conduct surveys of the industries in the community which are involved with military contracts or subcontracts. As has been pointed out, it is difficult to determine which industries in the community subcontract with DOD. However, using the SIC codes as a guide to the industries which may subcontract with the DOD provides a starting point. The metalworking, plastics, and electronics industries have been shown to be defense dependent to varying degrees (MATP, 1993). The previous section on the industrial mix of defense contractors gives a sense of the types of industries which contract and/or subcontract with the defense department (See Appendix B).

Community Impacts

When analyzing impacts of changes in military spending on a community, there are impacts to consider in addition to the health of a particular industry or other business within the community. These include the broader economic impacts or ripple effects throughout other sectors of the economy, labor impacts, and social impacts. It should be pointed out at the start, that as the traditional manufacturing base of many Massachusetts communities has been eroding, many industries such as the machine trades have become increasingly dependent upon defense dollars (Markusen and Yudeen, 1992). Defense contracting has provided consistent income, which serves to insulate companies and industries from the natural market forces. This growth in defense dependency has been seen most strongly in Eastern Mass., but has impacted the Western Counties as well. Now with those contract dollars starting to dry up small firms are feeling the impacts.

Economic Impacts

The federal Defense Conversion Commission estimates that 46,000 jobs will be lost in Massachusetts between 1991 and 1997 (Machine Action Trade Project, 1993:2). When dollars and jobs are lost in one industry in the local economy, there are ripple effects on other sectors of the economy. There are three levels of economic impacts: direct, indirect and induced. When a local business loses subcontracts or prime contracts this direct loss of dollars is manifested into a loss of jobs and salaries--these are direct impacts. Secondly, the indirect impacts are the losses which

result in other industries which supplied the defense contractor. Thirdly, the loss of salary to an employee will result in a loss of dollars spent locally for goods and services. The impacts on local coffee shop or barber shop as a result of less dollars being spent locally are the induced impacts. Therefore, the loss of one job has a "multiplier effect" in the local economy.

There are a variety of estimates as to the multiplier effect for the loss of defense related jobs. The effects of a base closure for example is different from the effects of a prime contractor laying off workers. For example it was calculated that for every job lost inside Electric Boat shipyard in Connecticut, another will be lost outside the company (Christian Science Monitor, Feb. 11, 1992). Thus, for every single defense related job loss there is another job lost in the community, resulting in a total loss of two jobs, or a multiplier of 2. A study on cutbacks at Fort Ord, California estimated that for every dollar lost in federal income (payroll), \$1.34 will be lost in the local economy (RKG Associates, 1992). The MATP estimate conservatively that for every defense dependent job, another 1.25 jobs are created in the local economy, i.e. a job multiplier of 2.25.

The multipliers presented above apply mainly to large prime contract employers, military bases, and other major Federal facilities. However since pathways for military dollars in Western Massachusetts are mostly through small prime contractors and subcontractors, these multipliers might not apply. Subcontractors may do some work for the government, but often this may only be a fraction of their total business.

Given the nature of defense spending in Western Massachusetts, it is difficult as described previously to determine the magnitude of the multiplier. With an increased dependency on defense dollars many of the smaller firms are ill equipped to adjust to the loss of sales to DOD. Each community has a different degree of defense dependency, and has many different types of industries involved with defense related contracts. As was pointed out a majority of the small contracts were one time orders, 64% of the contracts in the 1991-1987 period were not repeat contracts. Also, the data we have presented does not reflect a specific DOD program or weapon system. Therefore it is difficult to tell which contracts will be impacted unless it is known what programs are to be cut.

In summary, the diffuse nature of defense spending in Western Massachusetts makes it exceedingly difficult to determine what problems are directly attributable to changes in defense spending and what problems are attributable to the current recession and the continuing trends within the industries themselves, and these in turn make it difficult to analyze the impacts at the local level.

Labor Impacts.

As stated earlier, an estimated 46,000 defense jobs will be lost in Massachusetts between 1991 and 1997, the 3rd highest of any state. Another source states that the Northeast could lose up to 134,000 defense related jobs by 1995 (Business Week, July 2, 1990). These numbers do not include the thousands of additional service sector jobs that will be lost as well. With the closing of GE in Pittsfield, these losses are already being felt in Berkshire County. Also, the traditional manufacturing base of many Massachusetts communities has been eroding, which has resulted in many industries such as the machine trades becoming increasingly dependent upon defense dollars. While many manufacturers have seen their markets dwindle due to stiff foreign competition, defense contracts and subcontracts have offered a life raft. As these contracts disappear, small firms are forced to streamline their operations, cut hours and/or lay off workers, or shut down.

The problems in the manufacturing sector, however, are not wholly caused by defense spending. Of the small firms in the machine trades interviewed by the MATP, 42 of the 50 companies interviewed had been in business for "more than 20 years, some since the turn of the century and none less than 5 years" (MATP, 1993). Similarly, 23 of 40 electronics firms interviewed had been in business for more than 20 years. Defense dependency is only a fairly recent development in many of these companies' histories. This indicates that while defense spending has had an impact, there are other factors affecting these industries.

The subcontractor and prime contractor employee profiles are probably quite different, especially in the production/manufacturing sectors. The type of jobs lost is important, but even engineers have a tough time cracking the civilian market. Most often the job search results in a cut in pay for engineers and production line workers alike (Business Week, July 2, 1992). Some reports noted that blue collar workers who became unemployed are less likely to find work unless they relocate, and many with families and strong community roots are unwilling to relocate (Bluestone and Harrison, 1982).

Social Impacts

The loss of jobs in a community puts increased demands upon social services, including unemployment, welfare, mental health, substance abuse, and family services. Job losses increase the need for public assistance and welfare as we are experiencing in the current recession. Therefore, local unemployment centers need to assess the current job situation and look toward the

new job creation. As manufacturing declines, other areas such as the environment and biotech industries are on the rise. The loss of defense related jobs may spur efforts for job retraining and job creation matching skills with current and potential industry needs. Retraining efforts have typically had only marginal success. Teaching new skills does not necessarily mean that there will be jobs available in the local area for those skills, and this must be considered as job training programs are put in place.

For many workers displaced from manufacturing jobs, unemployment or underemployment is not temporary condition, and many suffered physical and mental health problems and a reduced standard of living as late as 2 and 4 years after layoffs (Bluestone and Harrison, 1982). Many workers losing their defense related job will be middle aged and can less easily make a career switch. The stress of mid-career job loss and extended underemployment can put strain on family relationships as the unemployed worker is cut off from the human relationships and interactions enjoyed when she or he was working. The combined result of these factors can be depression and loss of self esteem.

In North Adams, community workers noted unofficially that along with an increase in unemployment, came an increase in alcohol and drug abuse, child abuse and an increase in demand for mental health services (Center for Economic Development, 1992). These types of side effects related to job loss are not documented with hard statistics, but are certainly are part of the community impacts of unemployment. Ensuring that the necessary support systems for families are in place and publicized can be helpful in off-setting some of these effects.

Fiscal impacts

The loss of jobs and potential loss of population will directly impact the State and Local governments through a reduction in revenue. The Massachusetts Executive Office of Economic Affairs (EOEA) estimated that for every \$10,000 salary level job lost to the state, \$1,336 of revenue are lost in state and local tax revenue (Bluestone and Harrison, 1982). Additional fiscal losses come in the form of property tax and sales tax losses from firms which are forced to shut down. There are several potential impacts from population losses such as increased vacancy rates as people relocate, impacts on the schools with reduced numbers of children, and ultimately reduced revenues (i.e.. property tax, sales tax, service/license permit fees, gasoline tax, and motor vehicle taxes).

It is difficult to quantify these types of impacts in terms of the results of decreased defense spending in the region. Unlike a military base closure or industrial plant closure, the numbers and locations of people affected by changes in defense spending are not well defined. Furthermore, the health of local economies, diversity of the industrial base within communities, and the degree of defense dependency in community businesses all contribute to how the defense spending changes will play out at the local and regional level. All these factors vary greatly among communities.

IV. Conclusions

Federal defense spending and the influence it has on state economies is increasingly negative. This phenomenon is of course related to current cutbacks in weapon systems procurement by the federal government but also because defense expenditures are not, in and of themselves, necessarily good for local economies in the long term. It has been demonstrated that military spending can create fiscal imbalances, thus disrupting the market economies of various regions of the country. Dependency and inflation due to inefficiency are other problems associated with federal defense industries. High technology, a large component of the Massachusetts defense economy, is one industry that has a strong dependence on Department of Defense expenditures. Job creation is yet another questionable benefit of federal defense expenditures. There are many who argue that defense spending, while creating jobs, does not create as many as would be created if the same money were spent in the private sector.

How these assertions apply to the economy of Western Massachusetts is less clear. Defense spending occurs through a diffuse network with a few large contractors garnering the lion's share of the prime contract dollars, which in turn spread out those dollars to small subcontractors. Finding specific and up to date data about the extent of defense spending in the region is a complex task, particularly since there is no easy way to track subcontractors. In addition, the presence of Westover AFB and the recently closed create two anomalies when attempting to analyze Western Massachusetts as a whole. Pinning down defense dollars in Western Massachusetts is difficult also because the total spending, in terms of Prime contracts the region, is barely one percent at the most, of the DOD spending for the state. While there is abundant research on the state of Massachusetts, information specific to Western Massachusetts is not readily available.

Despite these problems, local governments can take steps to assess the potential effects of reduced military spending in their communities, beginning with the information about prime contractors presented in this report. Standard Industrial Codes also provide a means for identifying companies

which may be affected by changes in military spending. However, this also research suggests that there is not a specific set of "defense related" industries, rather, there are a wide range of manufacturing and service industries that contracted with the Department of Defense. The impacts of changes in DOD spending could have several consequences on local economies. In addition to the immediate economic effects of job losses, there is a multiplier effect in terms of dollars spent in the region for goods and services and jobs related to those services.

One important result of this research is that it identifies some of the gaps in information, which preclude a complete answer to the question: "How will changes in defense spending will affect the Western Massachusetts economy?" In terms of prime contracts, twenty companies in Western Massachusetts received 95% of DOD dollars, which suggests that the impact of cutbacks will be limited. But this is misleading for two reasons. The first is because of these prime contractors most likely subcontract out a high percentage of DOD work. The second is due to the strong ties in the Connecticut River Valley to defense contractors in Connecticut. Furthermore, DOD spending is linked to specific programs and weapon systems, which was were not discussed in this paper. Addressing these issues would require comprehensive survey work, as well as a strong working knowledge of the ins and outs of DOD budgeting and contracting.

This report just begins to scratch the surface of a enormously complex issue. It is an introduction for those unfamiliar with DOD spending and a stepping stone to foster further work at the local level to understand the impacts of military spending in Western Massachusetts communities.

BIBLIOGRAPHY

- Bluestone, Barry and John Havens, "Reducing The Federal Deficit Fair and Square", prepared for the symposium on the fortieth anniversary of the Congressional Joint Committee, The American Economy in Transition: From the Second World War to the 21st Century, Washington DC. 1986.
- Bluestone, Barry and Bennett Harrison. The De industrialization of America: Plant Closings, Community Abandonment, and Dismantling of Basic Industry. Basic Books, New York. 1982.
- Center for Economic Conversion. The Military in Your Backyard. 1984.
- Center for Economic Development. Berkshire County Overall Economic Development Program, University of Massachusetts, Amherst. 1993.
- Department of Employment and Training. "Defense Industry Profile." Massachusetts Department of Employment and Training, Boston. 1989.
- Directorate for Information, Operations and Reports. "Atlas/Data Abstract for the United States and Selected Areas". Department of Defense, Washington Headquarters Services, 1987.
- Directorate for Information, Operations and Reports, Report ST24, "Prime Contract Awards over \$25,000 by State, City and Contractor, Fiscal Year 1991 (Oct.- Sept.)" Department of Defense, Washington Headquarters Services, Washington DC., 1992.
- Directorate for Information, Operations and Reports, Report ST24, "Prime Contract Awards over \$25,000 by State, City and Contractor, Fiscal Year 1990 (Oct.-Sept.)" Department of Defense, Washington Headquarters Services, Washington DC., 1991.
- Directorate for Information, Operations and Reports, Report ST24, "Prime Contract Awards over \$25,000 by State, City and Contractor, Fiscal Year 1989 (Oct.- Sept.)" Department of Defense, Washington Headquarters Services, Washington DC., 1990.
- Directorate for Information, Operations and Reports, Report ST24, "Prime Contract Awards over \$25,000 by State, City and Contractor, Fiscal Year 1988 (Oct.- Sept.)" Department of Defense, Washington Headquarters Services, Washington DC., 1989.
- Directorate for Information, Operations and Reports, Report ST24, "Prime Contract Awards over \$25,000 by State, City and Contractor, Fiscal Year 1987 (Oct.- Sept.)" Department of Defense, Washington Headquarters Services, Washington DC., 1988.
- Gansler, Jacques S. Affording Defense. MIT Press, Cambridge. 1989.
- Gansler, Jacques S. The Defense Industry, MIT Press, Cambridge. 1980.
- Kaznocha, Edward F. "Defense Spending in Massachusetts". Massachusetts, Department of Employment and Training. Field Research Department, Boston. 1991.
- Machine Action Trade Project. "The demise of the Massachusetts Defense Connection". Industrial Services Program, Springfield, MA, 1993

- Markusen, Ann et al. Rise of the Gunbelt. Oxford University Press. New York. 1991.
- Markusen, Ann and Joel Yudken. Dismantling the Cold War Economy. Basic Books, Inc., New York. 1992.
- Ogden, Michael Dee. "A Military Dollar Really is Different: the Economic Impacts of Military Spending Reconsidered". Employment Research Associates, Lansing. 1988.
- Riddell, Tom. "The Employment Effects of Military Spending", presented to the Allied Social Science Association Meeting. December, 1984.
- Roth, Theodore. "The Impact of Decreased Defense Spending on employment in the United States". Armed Forces and Society, Vol 18, Spring 1992, pp 383-405.
- Ross, Elizabeth. "Two States Hit by Defense Cuts". Christian Science Monitor V84 #53, February 11, 1992.
- Spaid, Elizabeth Levitan. "Biting the Bullet: Connecticut looks beyond the Defense Industries." V83 #210. Sept. 24, 1991.
- Star Hitched to Military, Boston Globe, June 23, 1985
- RKG Associates, Inc. Economic Impact Analysis of the Downsizing of Fort Ord on Monterey County. Durham. June 1992.

Additional Resources

- Anderson, James R. "Bankrupting America: The Tax Burden and Expenditure of the Pentagon by Congressional District." Employment Research Associates. 1989.
- Cameron, Judith. "Defense Cuts Force Switch." Daily Hampshire Gazette, Vol 207, No. 169. March 26, 1993.
- Center for Economic Development. "Economic Base Analysis, Yankee Atomic Electric Company, Rowe, MA." University of Massachusetts, Amherst. Fall 1991.
- Ferguson, Thomas and John W. McCormack. "Critical Mass, The Economic Impact of the University of Massachusetts." Department of Political Science and Institute of Public Policy, University of Massachusetts, Boston. 1989.
- Reinvestment and Conversion and Initiative Staff. "Defense Reinvestment and Conversion." Washington D.C. March 11, 1993.
- "Star Hitched to Military." The Boston Globe. June 23, 1985.
- Wyeth, Barry. "The World According to Westfield". New England Monthly, Volume 3 #5. June 1986.

- _____. "The Demise of the Massachusetts Defense Connection." Industrial Services Program (ISP). March, 1993.
- _____. "Program Information Package for Defense Technology Conversion, Reinvestment and Transition Assistance". Advanced Research Projects Agency. Washington D.C. March 10, 1993.
- _____. "Adjusting to Changes in Defense Spending: A Report to the Legislature." Massachusetts Department of Employment and Training, Boston. 1989.
- _____. "Potential Impact of Defense Spending Reductions on the Defense Industrial Labor Force by State." Defense Budget Project. Washington DC. March 1992.

Appendices

Department of Defense Prime Contractors, Western Massachusetts

Berkshire County		1987	1988	1989	1990	1991
LOCATION	COMPANY					
Dalton	Transistor Specialties				\$109,000	\$288,000
Great Barrington	Omega Electronics					\$45,000
North Adams	East Hatfield Inc		\$105,000			
North Adams	Display Science Inc				\$49,000	
North Adams	Sprague Electric Co	\$87,000		\$262,000	\$56,000	\$30,000
North Adams	Tog Machining Co Inc		\$27,000	(\$27,000)		
Pittsfield	Amerco Environmental Svc	\$25,000				
Pittsfield	Cavallero Plastics, Inc		\$105,000			
Pittsfield	FMC Corporation		(\$167,000)			\$1,623,000
Pittsfield	General Dynamics			\$25,000		
Pittsfield	Hoyt Corporation					\$50,000
Pittsfield	Lightning Technologies Inc	\$104,000				
Pittsfield	O'Connell Oil Association			\$60,000		
Pittsfield	Ship Analytics Inc				\$149,000	
Pittsfield	Titan Roofing Inc					
Pittsfield	Tog Mold Tool and Die Co Inc	\$72,000				
Pittsfield	US Coating	\$77,000				
Sheffield	D & V Morin Construction	\$270,000				
Williamstown	Carol Cable Company Inc	\$191,000				
Total Berkshire County		\$826,000	\$70,000	\$320,000	\$363,000	\$2,036,000
Western Massachusetts Total		\$46,434,000	\$58,203,000	\$64,828,000	\$44,443,000	\$51,142,000
Pittsfield	General Electric Co	\$545,270,000	\$407,073,000	\$511,172,000	\$438,375,000	\$318,230,000

Department of Defense Prime Contractors, Western Massachusetts

Franklin County		1987	1988	1989	1990	1991
LOCATION	COMPANY					
Barnardston	Service Engineering Company*		\$49,000			
Deerfield	Hardigg Industries Inc	\$222,000				
Deerfield	Millitech Corporation	\$29,000				\$31,000
Erving	Douthitt W H Steel and Supply					
Greenfield	American Photographic Ap*		\$40,000			
Orange	B R Group Inc	\$189,000				
Orange	Harold Caplan Company				\$50,000	\$86,000
Orange	Hunt Rodney Company				\$139,000	
Orange	Leavitt Machine Co	\$43,000	\$209,000	\$109,000	\$57,000	\$39,000
South Deerfield	Bete Channing L Co Inc		\$43,000			
South Deerfield	Hardigg Industries Inc	\$4,460,000	\$1,582,000	\$2,144,000	\$2,756,000	\$2,341,000
South Deerfield	Millitech Corporation	\$573,000	\$286,000	\$4,743,000	\$441,000	
South Deerfield	Sun Microsystems Incorporated					\$224,000
Turners Falls	High Voltage Engineering		\$31,000	\$61,000	\$40,000	\$140,000
Turners Falls	Judd Wire Inc			\$64,000		
Total Franklin County		\$5,516,000	\$2,240,000	\$7,121,000	\$3,483,000	\$2,861,000
Western Massachusetts Total		\$46,434,000	\$58,203,000	\$64,828,000	\$44,443,000	\$51,142,000

Department of Defense Prime Contractors, Western Massachusetts

Hampden County		1987	1988	1989	1990	1991
LOCATION	COMPANY					
Agawam	Grace W R and Co Inc	\$431,000	\$26,000			
Agawam	Hartford Tool and Die Co Inc				\$61,000	
Agawam	Jet Industries Inc	\$201,000	\$489,000	\$245,000	\$235,000	\$93,000
Agawam	National Aerospace Corporation	\$177,000				
Agawam	Oxford Precision Inc			\$226,000		
Agawam	Raymond Industries	\$33,000				
Agawam	Ready Precision Inc (Feeding Hills)	\$149,000				
Agawam	Simon Container Machinery		\$224,000	\$126,000		
Agawam	Turcotte Manufacturing			\$70,000		\$621,000
Agawam	Wentgate Dynaweld Inc					
Bondsville	Conversion Engineering Inc	\$53,000				
Bondsville	Northeastern University			\$96,000		
Brimfield	Brimfield Precision Inc				\$30,000	
Brimfield	Shah Construction Co Inc		\$86,000			
Chicopee	All Star Maintenance Inc			\$244,000		
Chicopee	AT&T Information Systems					
Chicopee	AT&T Technologies Inc	\$182,000	\$226,000			
Chicopee	Blue Chip Painting		\$317,000			
Chicopee	Castro-Blanco Piscionei*		\$62,000			
Chicopee	Erco Interior Systems Inc					
Chicopee	Fleming A M Industries	\$237,000		\$55,000		\$69,000
Chicopee	Hoppe Tool Inc	\$124,000				
Chicopee	Jarsk Inc			\$2,769,000	\$181,000	
Chicopee	Lawlor Corporation			\$30,000		
Chicopee	Lyman John R Co					
Chicopee	Phoneix Tool and Repair	(\$84,000)	(\$76,000)			
Chicopee	PTB Inc					\$1,987,000
Chicopee	Strong Bill Enterprises					\$52,000
Chicopee	Titan Roofing Inc					\$170,000
Chicopee	TLT Construction Corporation			\$9,185,000		
Chicopee	Universal Plastic Corporation			\$36,000		
Chicopee	UPD Incorporated			\$73,000		
Chicopee	Yangti Hotel Corporation		\$90,000		\$27,000	\$142,000
Chicopee	Zero Corporation	\$238,000		\$121,000		\$303,000
East Longmeadow	Acoustical Screens Corporation	\$25,000				
East Longmeadow	Calfran International			\$88,000		\$128,000
East Longmeadow	Excel Dryer Corporation	\$59,000			\$95,000	
East Longmeadow	Hampden Engineering Corp	\$127,000	\$251,000		\$177,000	\$78,000
Holyoke	Acoustical Partitions*				\$29,000	\$36,000
Holyoke	Airtronics Compression E*	\$51,000				
Holyoke	Aquarius Air Systems		(\$28,000)			
Holyoke	Baltimore Stationary Co	\$215,000				
Holyoke	Blackwater Engineers		\$36,000		\$54,000	\$45,000
Holyoke	Coulter Source Inc				\$50,000	
Holyoke	Eastern Specialties Company					
Holyoke	Eye Communication System			\$31,000		
Holyoke	Garro Inc			\$83,000		
Holyoke	I M O Industries Inc	\$180,000			\$104,000	
Holyoke	Incom International	\$296,000	\$62,000	\$89,000		
Holyoke	Xidex Corporation	\$133,000				

SOURCE: Prime Contract Awards over \$25,000 by State, City and Contractor, DIOR, Washington D.C., FY 1987- 1991.

Department of Defense Prime Contractors, Western Massachusetts

LOCATION	COMPANY	1987	1988	1989	1990	1991
Holyoke	Atlas Copco Industrial			\$36,000		
Longmeadow	Hampden Engineering Corp					
Longmeadow	Tarbell J C Associates Inc		\$674,000		\$34,000	
Longmeadow	University of New Mexico*	\$38,000				\$98,000
Longmeadow	Xerox Corporation	\$150,000		\$98,000		\$105,000
Ludlow	Bulter Corp				\$30,000	
Ludlow	L & I Machine Inc			\$28,000		
Ludlow	Ludlow Textiles Co Inc	\$81,000				
Monson	Diversified Metals Inc	\$28,000	\$597,000	\$64,000	\$142,000	(\$58,000)
Monson	Gagliarducci Construction Co			\$30,000		
Monson	Zero Corporation	\$67,000	\$1,273,000	\$119,000	\$64,000	\$55,000
Northampton	Micro Cal	\$40,000				
Palmer	Siemens Capital Corporation	\$80,000				
Palmer	Airprep Technology Inc		\$222,000		\$155,000	\$139,000
Southwick	B & E Tool Co Inc	\$303,000	\$396,000	\$213,000	\$224,000	\$113,000
Southwick	Progressive Tool Co			\$279,000	\$83,000	
Springfield	Access	\$31,000				
Springfield	Air Pro Inc	\$57,000				\$43,000
Springfield	AR Bee Corp					
Springfield	Bangor Punta Corporation		\$28,000	\$74,000		
Springfield	Boston University				\$596,000	
Springfield	Boston University Truste*			\$3,426,000		
Springfield	Braxton Electronics Corporation		(\$25,000)		\$53,000	
Springfield	Callran International					
Springfield	Data General Corporation		\$40,000			
Springfield	Digital Equipment Corporation	\$43,000	\$45,000		\$55,000	
Springfield	Eastern Laboratories					\$50,000
Springfield	Gerhardt Holding Company	\$61,000				
Springfield	Governors America Corp			\$120,000		\$139,000
Springfield	Identikit Co					\$29,000
Springfield	Innovative Systems Inc	\$82,000				
Springfield	M R T Incorporated	\$99,000	\$64,000	\$90,000		
Springfield	Marine Systems Corporation			\$43,000		
Springfield	N S Corporation					\$56,000
Springfield	Precision Products Corp	\$38,000		\$163,000		
Springfield	Quamco Inc			\$368,000		
Springfield	Ralco, Inc					\$76,000
Springfield	Rexnord Inc	\$54,000				
Springfield	Smith & Wesson					
Springfield	Southeastern Sales Co	\$30,000				
Springfield	Target Precision Inc		\$40,000			
Springfield	Titelux Corporation	\$1,335,000	\$1,535,000	\$558,000	\$889,000	\$872,000
Springfield	Unifirst Corporation	\$856,000	\$471,000	\$547,000		\$126,000
Springfield	United Technologies Corporation		\$115,000			
Springfield	Western New England College				\$28,000	\$38,000
Springfield	Westvaco Corporation	\$29,000			\$45,000	
Springfield	Westvaco/US Envelope Division	\$29,000				
Springfield	Zaroco Inc		\$98,000			
Warren	Raytheon Company					\$39,000
West Springfield	American Cyanamid Co		\$543,000	\$546,000	\$175,000	\$688,000
West Springfield	Eagle Precision Inc		\$65,000			

SOURCE: Prime Contract Awards over \$25,000 by State, City and Contractor, DIOR, Washington D.C., FY 1987- 1991.

Department of Defense Prime Contractors, Western Massachusetts

LOCATION	COMPANY	1987	1988	1989	1990	1991
West Springfield	Experimental Tool Co		\$26,000			\$134,000
West Springfield	Fipco Products Inc		\$29,000			
West Springfield	K & M Electronics Inc	\$64,000				
West Springfield	Nortek Inc	\$57,000	\$89,000			\$47,000
West Springfield	Sanford Tool and Design Inc	\$657,000	\$119,000		\$93,000	\$47,000
Westfield	Advance Manufacturing Co Inc	\$135,000		\$185,000	\$454,000	
Westfield	Aero Fastener Inc			\$26,000		
Westfield	Alcon Products Inc					\$97,000
Westfield	Agway Petroleum Corporation		\$426,000	\$586,000	(\$28,000)	
Westfield	Alderman & MacNeish Inc					\$105,000
Westfield	Baldridge & Associates Arch					\$118,000
Westfield	Berkshire Industries Inc	\$1,980,000	\$1,378,000	\$988,000	\$1,136,000	\$146,000
Westfield	Digital Equipment Corp	\$318,000	\$503,000	\$467,000	\$1,089,000	\$152,000
Westfield	Enterprise Engineering Inc					\$117,000
Westfield	FMR Grinding Wheel Corporation			\$65,000		
Westfield	GEM Inc				\$41,000	
Westfield	Gale Associates Inc					\$166,000
Westfield	Hoyt Corporation		\$481,000			
Westfield	Industrial Precision Inc		\$132,000	\$87,000		
Westfield	Instrument Technology Inc	\$84,000	\$684,000	\$59,000	\$521,000	
Westfield	Keyes Associates					\$117,000
Westfield	Lane Construction Corporation			\$63,000		
Westfield	Mattai Joseph P and Associates					\$80,000
Westfield	PTM Industries Corp	\$551,000	\$465,000			
Westfield	Severyn, Fred M	\$95,000				
Westfield	Sperry Corporation					
Westfield	Tell Tool Inc			\$68,000	\$37,000	
Westfield	TJ Conway Company			\$163,000		
Westfield	Unisys Corporation	\$32,000				
Westfield	Westfield Construction	\$79,000				
Westfield	Westfield Gage Co Inc	\$622,000	\$276,000	\$733,000	\$774,000	\$195,000
Wilbraham	Battelle Memorial Institute			\$45,000	\$44,000	\$48,000
TOTAL HAMPDEN COUNTY		\$11,035,974	\$12,557,976	\$23,907,978	\$7,780,980	\$7,989,982
Total Westover Air Force Base		\$17,374,000	\$32,285,000	\$8,022,000	\$6,862,000	\$16,710,000
Western Massachusetts Total		\$46,434,000	\$58,203,000	\$64,828,000	\$44,443,000	\$51,142,000

Department of Defense Prime Contractors, Western Massachusetts

<i>Hampshire County</i>		1987	1988	1989	1990	1991
LOCATION	COMPANY					
Amherst	Amerimex Artificial Intelligence			\$50,000	\$226,000	\$4,198,000
Amherst	Amherst College Inc	\$219,000	\$60,000	\$53,000	\$70,000	\$112,000
Amherst	Battelle Memorial Institute	\$115,000	\$28,000			
Amherst	Blackboard Technology Gr					\$44,000
Amherst	Chan Computer Corp				\$250,000	\$435,000
Amherst	KSE Inc	\$100,000		\$279,000	\$250,000	
Amherst	Lisp Machine Inc	\$79,000				
Amherst	Millitech Corporation	\$142,000				
Amherst	New England Energy Development	(\$128,000)				
Amherst	Northampton Manufacturing*				\$108,000	\$30,000
Amherst	Omnitherm Corporation				\$63,000	
Amherst	Polymer Lab Inc	\$70,000	\$64,000	\$133,000		\$150,000
Amherst	Quadra Engineering Inc				\$50,000	\$319,000
Amherst	Top Level Inc					\$50,000
Amherst	University of Massachusetts	\$8,842,000	\$9,722,000	\$7,761,000	\$4,080,000	\$4,384,000
Amherst	VI Corp	\$66,000				
Easthampton	National Felt Co	\$236,000				
Easthampton	Riverside Industries Inc	\$461,000	\$443,000	\$849,000		\$375,000
Florida	Dialog Systems Inc		\$98,000	\$60,000		
Granby	Combustion Engineering	\$84,000				
Granby	Inter-all Corp			\$38,000		
Hadley	James River Graphics Inc	\$34,000				
Hadley	James River Paper Co	\$123,000				
Huntington	Dalton Tractor Co Inc			\$48,000		
Huntington	Enpro Services Inc					\$35,000
Huntington	Feerick Fence Co, Inc					\$35,000
Huntington	Lane Construction			\$25,000		
Huntington	Warner Brothers			\$73,000		
New Salem	Digital Equipment Corporation	\$126,000				
Northampton	Alaska Extinguishers				\$507,000	
Northampton	Alexander Services Company	\$42,000				
Northampton	Berkshire Electric Cable		\$28,000			
Northampton	Cableco Inc		\$67,000		\$63,000	
Northampton	Graves Equipment Inc	\$69,000				
Northampton	Kollmorgen Corporation	\$15,795,000	\$31,835,000	\$22,702,000	\$25,174,000	\$26,990,000
Northampton	Northampton Machine Co	(\$69,000)				
Northampton	Northampton Manufacturing			\$117,000	***	
Northampton	Temp Pro Incorporated			\$39,000	\$41,000	\$273,000
Northampton	Yankee Hill Machine Co Inc	\$1,983,000	\$845,000	\$623,000	\$1,209,000	\$712,000
South Hadley	James River Corp Virginia				\$67,000	
South Hadley	James River Graphics Inc	\$389,000		\$44,000	\$337,000	\$91,000
South Hadley	James River Paper Co	\$119,000	\$47,000	\$258,000	\$267,000	\$26,000
South Hadley	Kardex Systems Inc			\$28,000		
South Hadley	Mount Holyoke College	\$63,000	\$102,000	\$26,000	\$58,000	
South Hadley	Suburban Microfilm Service			\$277,000		
South Hadley	Temp-Pro Inc	\$26,000				
Southampton	Marmori/Keystone Corporation	\$74,000				
Total Hampshire County		\$29,060,000	\$43,339,000	\$33,483,000	\$32,820,000	\$38,259,000
Western Massachusetts Total		\$46,434,000	\$58,203,000	\$64,828,000	\$44,443,000	\$51,142,000

SOURCE: Prime Contract Awards over \$25,000 by State, City and Contractor, DIOR, Washington D.C., FY 1987- 1991.

Prime Contract Awards, Westover Air Force Base

Location	Company	1987	1988	1989	1990	1991
Westover AFB	Addison L & Associates Inc				\$313,000	\$345,000
Westover AFB	American Business Comm Inc		\$2,946,000	\$91,000	\$87,000	\$165,000
Westover AFB	Americorp Inc			\$47,000	\$57,000	
Westover AFB	American Striping Inc					\$80,000
Westover AFB	Anderson George Construction				\$90,000	
Westover AFB	Antunes Management Company					
Westover AFB	Associated Building and Wr*			\$308,000		
Westover AFB	BG Service Co Inc			\$78,000	\$45,000	
Westover AFB	Barnes Electric Company		\$684,000			
Westover AFB	Bay State Gas Company			\$257,000	\$230,000	\$355,000
Westover AFB	Beardsley Beardsley Cowd*					
Westover AFB	Beco Electrical Contractors					
Westover AFB	Belco Inc			\$889,000	\$26,000	
Westover AFB	Bennetts Janitorial					\$410,000
Westover AFB	Berger Lewis International	\$508,000	\$32,000			
Westover AFB	Bibeau Construction Co Inc				\$39,000	
Westover AFB	Black and Veatch	\$26,000				
Westover AFB	Blount Brothers Corporation		\$17,574,000	\$80,000		
Westover AFB	Blount Incorporated				\$213,000	
Westover AFB	Blue Chip Painting Inc					\$98,000
Westover AFB	Burkel Construction Inc					\$66,000
Westover AFB	CQ Construction Corporation					\$6,204,000
Westover AFB	Carlson Associates Inc	\$41,000	\$135,000			
Westover AFB	Chem-wood Corporation		\$908,000			
Westover AFB	Chicopee, City of	\$596,000	\$719,000	\$751,000	\$911,000	\$1,295,000
Westover AFB	Ciocca Construction Corp	\$72,000				
Westover AFB	City of Chicopee Electric Lg*					
Westover AFB	Cocoa, City of *	\$53,000				
Westover AFB	Coastal Energy Inc		\$97,000			
Westover AFB	Cole and Cole Construction					\$65,000
Westover AFB	Commercial Glass and Glazing				\$289,000	

Source: Prime Contract Awards of over \$25,000 by State, City, and Contractor, DIOR, Washington, DC, FY 1987-1991.

Prime Contract Awards, Westover Air Force Base

Location	Company	1987	1988	1989	1990	1991
Westover AFB	Commercial Siding Maintenance		\$90,000			
Westover AFB	Congress Construction Co		\$27,000			
Westover AFB	Costello Industries Inc					
Westover AFB	Custom Pools, Inc					\$155,000
Westover AFB	DPC General Contractors Inc	\$294,000				
Westover AFB	Della Construction Co Inc					\$1,735,000
Westover AFB	Dick A B Company Inc					
Westover AFB	Dillon Boiler Services, Inc					\$55,000
Westover AFB	Duda Rubbish Removal Inc	\$33,000	\$36,000	\$132,000	\$142,000	\$207,000
Westover AFB	Eastern General Contract				\$299,000	(\$299,000)
Westover AFB	Eastern Steel Erectors Inc			\$2,675,000	\$73,000	
Westover AFB	Ecology and Environment Inc			\$85,000		
Westover AFB	Environmental Management		\$28,000			
Westover AFB	Envco National		\$194,000			
Westover AFB	Francese Joseph Inc			\$309,000		
Westover AFB	Fay Spoffard and Thorndike		\$111,000		\$154,000	\$296,000
Westover AFB	Federman Construction Co	\$55,000				
Westover AFB	Fraser Engineering					\$299,000
Westover AFB	Friends of the Retarded		\$193,000	\$267,000	\$358,000	\$382,000
Westover AFB	Fruean Utilities Inc	\$186,000	\$42,000		\$68,000	
Westover AFB	Garland Construction Corp		\$419,000		\$45,000	
Westover AFB	Geitmann Woodruff Inc			\$112,000		
Westover AFB	Goldberg-Zoino and Associates		\$197,000		\$92,000	
Westover AFB	Goncalves Jack & Sons Inc					
Westover AFB	Green A R and Son Inc					\$33,000
Westover AFB	Griffin-Wolf Constructor		\$4,547,000			
Westover AFB	Gulf South Partners 81-2		\$355,000			
Westover AFB	Hamilton Enterprises Inc		\$41,000			
Westover AFB	Hammitt Corp					\$85,000
Westover AFB	Handford Oil and Asphalt					\$44,000
Westover AFB	Harriman Associates	\$72,000	\$93,000			

Source: Prime Contract Awards of over \$25,000 by State, City, and Contractor, DIOR, Washington, DC, FY 1987-1991.

Prime Contract Awards, Westover Air Force Base

Location	Company	1987	1988	1989	1990	1991
Westover AFB	Home Electric Co	\$201,000				
Westover AFB	Industrial Consultants Inc		\$40,000			
Westover AFB	Interstate Plumbing and Heating		\$58,000			
Westover AFB	Inwin Disposal and Abatement		\$242,000		\$90,000	
Westover AFB	Kendland Company Inc				\$2,196,000	
Westover AFB	Kenneth Baru and Company					\$574,000
Westover AFB	Kimco Inc	\$165,000				
Westover AFB	Lane Construction Corporation	\$14,230,000	\$28,000	\$295,000	\$156,000	
Westover AFB	Lapinski Electric Inc	\$28,000				
Westover AFB	Lenard Engineering		\$131,000	\$26,000		
Westover AFB	Lawlor Corporation				\$287,000	\$349,000
Westover AFB	Mazal Fuel Co Inc			\$233,000		
Westover AFB	Miller Joseph J Building		\$1,176,000	\$787,000		
Westover AFB	Michigan Joint Sealing					\$246,000
Westover AFB	Murphy Timothy Architect		\$27,000	\$65,000		
Westover AFB	Niemela Construction Company			\$151,000	\$221,000	\$184,000
Westover AFB	Northup David R Electric Con	\$86,000				
Westover AFB	Octagon Process Inc				\$92,000	
Westover AFB	Over and Under Piping Cont					\$657,000
Westover AFB	Palmer Paving Corp			\$179,000		\$824,000
Westover AFB	Prestige					
Westover AFB	Praught Construction Corp				\$65,000	
Westover AFB	R A B Construction Inc					
Westover AFB	R.A.C. Builders Inc					\$57,000
Westover AFB	Richard A. Turner Co Inc					\$187,000
Westover AFB	Ruiz Pedrelli Kennedy					\$409,000
Westover AFB	Sanders R J Inc			\$84,000		
Westover AFB	Schaardt and Fullan					
Westover AFB	Scotsman Group Inc				\$63,000	
Westover AFB	Sea Containers Inc				\$37,000	
Westover AFB	Sea Container America Inc			\$48,000		\$36,000

Source: Prime Contract Awards of over \$25,000 by State, City, and Contractor, DIOR, Washington, DC, FY 1987-1991.

Prime Contract Awards, Westover Air Force Base

Location	Company	1987	1988	1989	1990	1991
Westover AFB	Sealcoating Inc					
Westover AFB	Shah Construction Company					\$776,000
Westover AFB	Staunton Jack L Assoc					
Westover AFB	Storch Engineers	\$42,000				
Westover AFB	Sullivan Eugene	\$26,000				
Westover AFB	Surface Systems Inc					\$193,000
Westover AFB	Sverdrup Corporation				\$124,000	
Westover AFB	Titan Roofing Inc	\$121,000				
Westover AFB	Two Hatchets Corp					\$86,000
Westover AFB	Unisys Corporation	\$30,000				
Westover AFB	Williams Mobile Offices		\$83,000	\$73,000		
Westover AFB	Woolpert Consultants	\$255,000	\$59,000			
Westover AFB	Zecco Inc		\$33,000			
Westover AFB	Zetlin Lev Associates, Inc	\$254,000	\$940,000			\$57,000
	TOTAL	\$17,374,000	\$32,285,000	\$8,022,000	\$6,862,000	\$16,710,000

Department of Defense Prime Contractors, Western Massachusetts

SIC	LOCATION	COMPANY	1987	1988	1989	1990	1991	Total
22	Ludlow	Ludlow Textiles Co Inc	\$81,000					\$81,000
22	Easthampton	National Felt Co	\$236,000					\$236,000
22,23,28	Chicopee	Lyman John R Co			\$30,000			\$30,000
24,34,36,48	Agawam	Raymond Industries	\$33,000					\$33,000
26	Springfield	Westvaco Corporation	\$29,000			\$45,000		\$74,000
26	Springfield	Westvaco/US Envelope Division	\$29,000					\$29,000
26,28,38,39	South Hadley	James River Graphics Inc	\$389,000	\$47,000	\$44,000	\$337,000	\$91,000	\$908,000
26,30	South Deerfield	Hardigg Industries Inc	\$4,460,000	\$1,582,000	\$2,144,000	\$2,756,000	\$2,341,000	\$13,283,000
26,30,34	Holyoke	Eastern Specialties Company				\$50,000	\$45,000	\$95,000
28	Wilbraham	Battelle Memorial Institute			\$45,000	\$44,000	\$48,000	\$137,000
30	Pittsfield	Cavallero Plastics, Inc		\$105,000				\$105,000
30	Chicopee	Universal Plastic Corporation			\$36,000			\$36,000
30,31	Chicopee	Zero Corporation	\$238,000		\$121,000		\$303,000	\$662,000
30,33,34,35,37	Springfield	Titellex Corporation	\$1,335,000	\$1,535,000	\$558,000	\$889,000	\$872,000	\$5,189,000
30,34	Pittsfield	Tog Mold Tool and Die Co Inc	\$72,000					\$72,000
32,35,36	North Adams	Sprague Electric Co	\$87,000		\$262,000	\$56,000	\$30,000	\$435,000
32,36	Westfield	Digital Equipment Corporation	\$318,000	\$503,000	\$467,000	\$1,089,000	\$152,000	\$2,529,000
33	Turners Falls	Judd Wire Inc.**			\$64,000			\$64,000
33	Northampton	Northampton Manufacturing			\$117,000		*(see Amherst)	\$117,000
34	Northampton	Yankee Hill Machine Co Inc	\$1,983,000	\$845,000	\$623,000	\$1,209,000	\$712,000	\$5,372,000
34,35	Orange	Leavitt Machine Co	\$43,000	\$209,000	\$109,000	\$57,000	\$39,000	\$457,000
34,35,37	Southwick	B & E Tool Co Inc	\$303,000	\$396,000	\$213,000	\$224,000	\$113,000	\$1,249,000
34,35,37	Westfield	Berkshire Industries Inc	\$1,980,000	\$1,378,000	\$988,000	\$1,136,000	\$146,000	\$5,628,000
34,35,37	Agawam	Jet Industries Inc	\$201,000	\$489,000	\$245,000	\$235,000	\$93,000	\$1,263,000
34,35,37	Springfield	Rexnord Inc	\$54,000					\$54,000
35	Holyoke	Atlas Copco Industrial			\$36,000			\$36,000
35	West Springfield	Experimental Tool Co		\$26,000			\$134,000	\$160,000
35	Chicopee	Hoppe Tool Inc	\$237,000		\$55,000			\$292,000
35	Ludlow	L & I Machine Inc* (L&L Machine)			\$28,000			\$28,000
35	West Springfield	Nortek Inc	\$57,000	\$89,000			\$47,000	\$193,000
35	Agawam	Oxford Precision Inc			\$226,000			\$226,000
35	Springfield	Precision Products Corp	\$38,000		\$163,000			\$201,000
35	Agawam	Simon Container Machinery		\$224,000	\$126,000			\$350,000
35	Westfield	Tell Tool Inc			\$68,000	\$37,000		\$105,000
35	Westfield	Westfield Gage Co Inc	\$622,000	\$276,000	\$733,000	\$774,000	\$195,000	\$2,600,000
35,36	Springfield	Digital Equipment Corporation	\$43,000	\$45,000		\$55,000		\$143,000
36	East Longmeadow	Excel Dryer Corporation	\$59,000			\$95,000		\$154,000
36,38	East Longmeadow	Hampden Engineering Corp	\$127,000	\$251,000		\$177,000	\$78,000	\$633,000
36,38,	Northampton	Kollmorgen Corporation	\$15,795,000	\$31,835,000	\$22,702,000	\$25,174,000	\$26,990,000	\$122,496,000
38	Greenfield	American Photographic Appliance Corp		\$40,000				\$40,000
38	Brimfield	Brimfield Precision Inc					\$40,000	\$40,000
38	Westfield	Instrument Technology Inc	\$84,000	\$684,000	\$59,000	\$521,000		\$1,348,000
38	Holyoke	Xidex Corporation	\$133,000					\$133,000
Aerospace comp.	West Springfield	Sanford Tool and Design Inc	\$657,000	\$119,000		\$93,000	\$47,000	\$916,000
Aircraft parts	Agawam	National Aerospace Corporation	\$177,000					\$177,000
Aircraft parts	Agawam	Ready Precision Inc (Feeding Hills)	\$149,000					\$149,000
precis. machine shop	Westfield	Advance Manufacturing Co Inc	\$135,000		\$185,000	\$454,000		\$774,000
Publishing	South Deerfield	Bete, Channing L Co Inc		\$43,000				\$43,000
water cont. eq	Orange	Hunt, Rodney Company				\$139,000		\$139,000
		TOTAL	\$30,184,000	\$40,721,000	\$30,447,000	\$35,646,000	\$32,516,000	\$169,514,000
		Percent of Western Mass Total	65.00%	69.96%	46.97%	80.21%	63.58%	

SOURCE: Prime Contract Awards over \$25,000 by State, City and Contractor, DIOR, Washington D.C., FY 1987-1991.